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Via Electronic Filing

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, SW
Washington, D.C. 20554

Re: Ex Parte Notice, WT Docket No. 11-69, ET Docket No. 09-234

Dear Ms. Dortch:

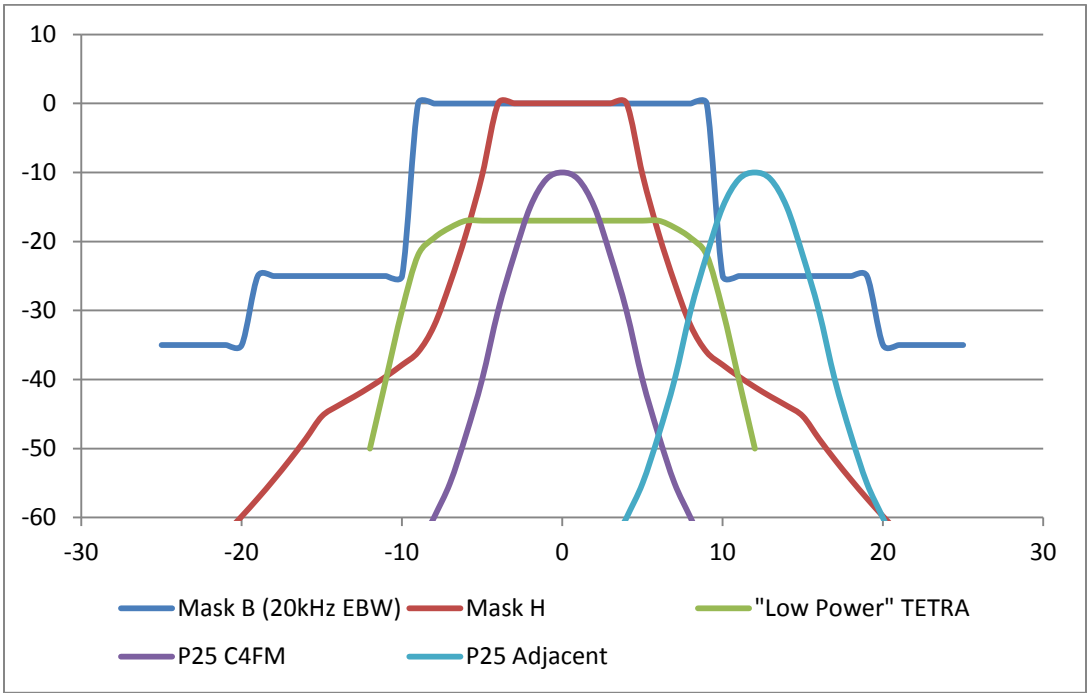
Harris Corporation (Harris) submits further information with regard to use of TETRA and derivative technology in public safety spectrum, and addresses the recent comments of parties that merit response.[1] While Harris intends on submitting more comprehensive proposals in the very near future, Harris feels compelled to respond to assertions in the record that are technically inaccurate.

I. Correcting Inaccurate Statements Attempting to Minimize Interference Resulting From "Low-Power" TETRA Operations in NPSPAC Channels.

PowerTrunk indicates that the modest changes of the TETRA standard it implemented to create its proprietary "low-power" TETRA product makes it safe for operation on public safety frequencies.[2] However, the claim that its α=0.2 filter is an audio filter allowing the use of the MASK-B is inaccurate. This filter operates on the IQ data coming from the pi/4-DQPSK modulation on the dibit symbols coming from the vocoder, specifically to limit the 99% BW to 20 kHz. The spectrum of the generated signal is dependent only on this α=0.2 IQ filter and is independent to any audio filtering that is done on the actual analog signal coming from the microphone and finally into the vocoder. This is in sharp contrast to analog FM modulation where the audio filtering on the voice signal does limit the BW for the transmitted spectrum and to which the Mask-B is appropriate. Therefore, the claim, "…the fact that Mask H was more stringent does not provide any additional benefit in comparison with Mask B…"[3] is false.

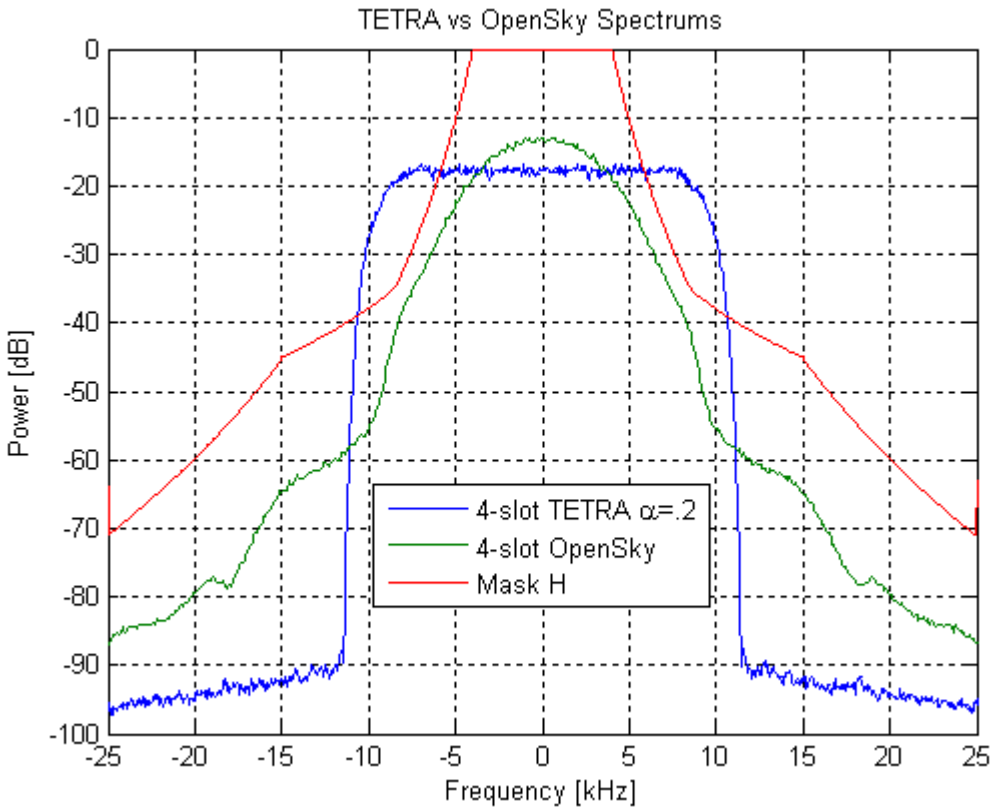
As can be seen from the plots of the emission masks below, Mask-H requires approximately 35 dB more attenuation of the spectrum at certain frequencies than Mask-B. Further, this graphic shows the clear interference to adjacent P-25 systems by "low-power" TETRA, TETRA derivative technology, and all other Mask-B-only technologies.

[1] *See* Ex Parte Notice, PowerTrunk, WT Docket No. 11-69, ET Docket No. 09-234 (Mar. 23, 2012) (PowerTrunk Ex Parte). *See also* Ex Parte Notice, APCO, WT Docket No. 11-69, ET Docket No. 09-234 (Mar. 23, 2012) (APCO Ex Parte).
[2] *See* PowerTrunk Ex Parte at 4.
[3] *Id*.



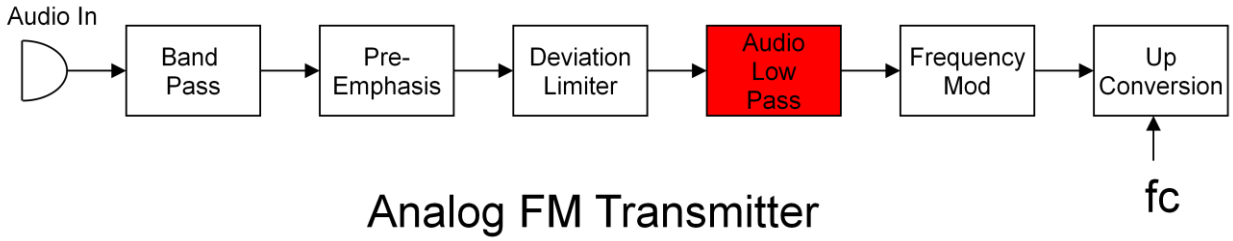
Equally inaccurate is PowerTrunk's statement, "Although it is not entirely clear, if Harris is advocating that NPSPAC frequencies should be restricted to a bandwidth of 12.5 KHz, the result would be that all high-capacity 4-slot TDMA technologies would be banned and thus only low-capacity TDMA technologies would be allowed."[4] High-capacity 4-slot TDMA technologies are safely in operation pursuant to Commission rules today. For example, Harris' OpenSky® LMR product operates using 4-slot TDMA technology with exactly the same voice capacity as TETRA and meets all the spectrum requirements of the NPSPAC H-Mask. In fact, it has greater capacity than TETRA, since a single OpenSky® channel has both control channel and 4-slots of voice in sharp contrast to TETRA which requires a dedicated control slot. A comparison of the TETRA α=.2 spectrum versus the OpenSky® NPSPAC spectrum relative to the H-Mask is shown below.

[4] *Id. at 7.*

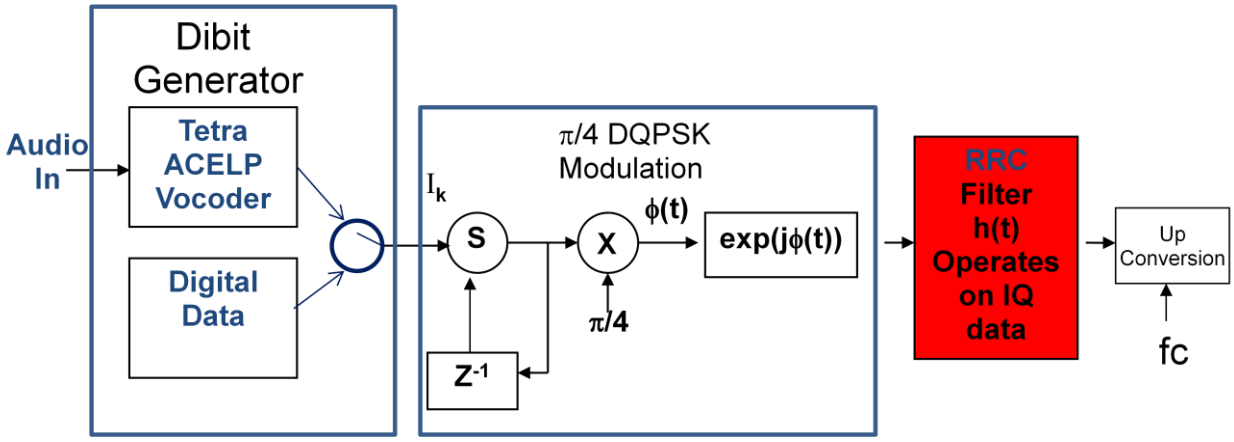


Lastly, PowerTrunk claims that "a digital transmitter equipped with an audio low pass filter implemented in the digital domain qualifies for being certificated under Mask B for NPSPAC, and cites a removal of Rule 90.211 in 1999 as some form of justification. Section 90.211 was formerly known as §88.417 (which was deleted from the Commission's Rules in 1999). The language used in Commission documents as §88.417 was modified throughout the years up to and including the eventual deletion of §90.211 supports the assertion the "audio low-pass filter" proviso in §90.210 regarding mask applicability does not apply, or is not available when equipment employs digital modulation. In other words, the "audio low-pass filter" proviso is only available to equipment modes utilizing analog FM modulation. This interpretation is further supported by the fact there is absolutely no difference in the spectrum profile of voice transmissions and data transmissions when digital modulation is concerned. However, the same is not true for equipment employing analog FM modulation.

Below are some simplified block diagrams depicting the differences between analog and digital voice processing. These diagrams clearly show in cases of analog FM modulation the audio low-pass filter referenced in §90.210 regarding mask applicability is applied to the un-modulated audio signal, yet in the case of digital modulation the RRC filter, which is claimed by PowerTrunk to be the equivalent of the audio low pass filter for purposes of mask applicability, is applied to the already modulated signal.



Analog FM Transmitter



π/4 DQPSK Digital Modulation Block Diagram

It should be noted that, because of a general belief by qualified engineers that the use of the "audio low-pass filter" proviso when selecting applicable masks for equipment employing digital modulation would result in unacceptable levels of interference, public safety equipment manufacturers have not utilized the "audio low-pass filter" proviso in the case of digitally modulated equipment. The fear is that use of the "audio low-pass filter" proviso would lead to the creation of interference in most if not all LMR frequency bands similar to the situation created in the 800 MHz spectrum, which resulted in 800 MHz "Reconfiguration."[5]

II. Recent Activities Compel Harris Input and Commission Action.

Much has been made about the timing of Harris' submissions to the Commission on this matter.[6] Harris has long expressed technical concerns about inevitable interference resulting from TETRA operations in public safety frequencies.[7] Moreover, Harris earnestly believed that the Clarification Order resolved this matter and precluded "low-power" TETRA operation in public safety frequencies.[8] Harris also believed that the obvious, recorded interference concerns and the FCC's input on this matter would preclude any jurisdiction from being able to justify using TETRA and derivative technology in NPSPAC spectrum. However, due to the fact that these concerns were not heeded in the

[5] It is vital to note that the discussion above applies to radio devices, and that base stations bring with them additional concerns. In the case of a TETRA, TETRA derivative, or other digital base station technologies, there is no audio path in which to even apply an audio filter. Meanwhile, analog repeaters do demodulate and re-modulate, and hence audio filtering can be incorporated into an analog repeater.`

[6] *See, generally, id.*

[7] *See, e.g.*, Comments of Harris Corporation, WT Docket No. 11-69 and ET Docket No. 09-234, 5-8 (filed Jun. 27, 2011).

[8] *See Order on Clarification*, WT Docket No. 11-69 and ET Docket No. 09-234, 26 FCC Rcd 13360 (rel. Sept. 28, 2011) ("Clarification Order") (stating the Commission's intent to "ensure that TETRA equipment would not be operated in the vicinity of public safety systems.").

case of New Jersey Transit (NJT), and as applications for Commission authorization to use "low-power" TETRA by NJT in public safety frequencies are imminent, Harris believes that additional, immediate action from the Commission is necessary. Further, this issue now expands beyond the decision of one jurisdiction: If NJT is allowed to use "low-power" TETRA in NPSPAC channels, other jurisdictions may follow suit, leading to widespread interference among first responders on a nationwide basis.

Ultimately, complaints about the timing of Harris' assertions cannot mitigate the interference that both TETRA and "low-power" TETRA will cause to first responders in the field. These concerns have been well affirmed by APCO in its recent filing:

> …a vendor is currently seeking to deploy TETRA equipment on public safety spectrum, claiming that it will operate at "low power" and therefore not cause interference. Harris Corporation demonstrates in its letter, however, that even such "low power" TETRA operations could interfere with adjacent channel public safety communications. APCO International agrees with that analysis…. Therefore, we urge the FCC to prevent the introduction of TETRA or other technologies where there is evidence that such equipment could lead to interference to public safety radio communications or harm critical interoperability within public safety spectrum.[9]

III. The Core Issue is The Proper Application of Emission Masks to Protect Public Safety.

The situation now facing the Commission is not simply a matter of deciding whether the Mask-B or Mask-H is appropriate for application by TETRA and/or "low power" TETRA equipment for the NPSPAC spectrum. The issue is a more general one: should digitally modulated equipment, regardless of technology take advantage of the "audio low-pass filter" proviso in §90.210 when selecting the appropriate mask to be applied in public safety frequencies.

We hope that this information places arguments against Harris' position on this matter, asserted in the recent PowerTrunk filing, in context. Accordingly, Harris reiterates its request that the Commission immediately:

> 1) Affirm that pre-existing type certifications are not grand-fathered and that "low power TETRA" equipment is not exempt from the Clarification Order's clear statement that all TETRA equipment and operations are prohibited in public safety frequencies or otherwise in the vicinity of public safety systems.
>
> 2) Require that digitally modulated signals be certified under the more stringent H-Mask for use in NPSPAC spectrum. This policy should apply to all digital technologies, not only to those based on TETRA standards.
>
> 3) Withdraw the NPSPAC portion of any existing certification for digital equipment that only applied the Mask B when determining compliance in NPSPAC spectrum.

[9] APCO Ex Parte at 1, 2.

4) Affirm that equipment type certified for use in public safety spectrum must also include support for mutual aid channels and equipment type certifications must include these modes of operation.

We thank the Commission for its consideration, and look forward to its prompt action.

Respectfully submitted,

_____/s/_____

Patrick Sullivan
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Harris Corporation